

# PATENT SPECIFICATION

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## (54) A FLAT KEY FOR CYLINDER LOCKS

(71) We, CRASNIANSKI FRANCE S.A., a societe anonyme organised and existing under the laws of France, of 8 rue du Général ferrié, 38 Grenoble, France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:  
 5 This invention relates to a flat key for cylinder locks which is made in at least two parts, namely a shank profiled and milled along its edges in accordance with the

formed in a separate operating head, where-  
 in the operating head is made of a moulded  
 plastics material which is sufficiently flex-  
 50 ible to enable the shank to be forced into the  
 slot with consequent deformation of the  
 operating head, the said operating head and  
 the shank being rigidly held together by the  
 elastic or frictional forces caused by the  
 deformation of the head.

This effect of the deformation of the  
 operating head can be reinforced by insert-  
 ing into openings formed in the head locking  
 members of various shapes anodized in  
 55 60

## PATENTS ACT 1949

## SPECIFICATION NO 1418268

The following corrections were allowed under Section 76 on 18 February 1977.

Page 1, line 1 (71), after We, insert KIS FRANCE S.A. of 47 Avenue Marie Reynoard, 38100, Grenoble, France, formerly known as,

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 16 March 1977

Bas 34409/4

shape in the operating head, the assembly  
 being held together by frictional forces  
 occurring between the surfaces of the  
 wedge-shaped head of the shank and the  
 35 surfaces of the slot in the manner of a so-  
 called "Morse" cone mounting of the kind  
 used for positioning a spindle in the  
 headstock of a lathe.

The present invention relates to a key  
 40 with a separate head which provides for  
 much simpler assembly and which calls for  
 far less precision in formation both of the  
 head of the shank and of the slot in the  
 separate operating head.

The key according to the invention  
 45 comprises a shank with an elongated head  
 having a width equal to or slightly greater  
 than that of the shank engaged in a slot

view of and a cross-section through an em-  
 bodiment in which the assembly is locked by  
 insertion of an auxiliary element, Figures 7,  
 8 and 9, 10 being corresponding views of  
 another two similar embodiments.

Figures 11 and 12 are respectively an  
 elevation of and a cross-section through a  
 key comprising a two-part operating head.

Figures 13 and 14 show a key in which the  
 two parts of the key are locked in position  
 by heat-induced deformation of the  
 operating head.

The key illustrated in Figure 1 consists of  
 a shank 1, which is shown merely as a blank,  
 and which comprises a wedge-shaped head  
 2, as in French Patent No. 73 14 753,  
 formed near its rounded end with a hole 3  
 for mounting the key on a key ring, key

[Price 33p]

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(19)

## (54) A FLAT KEY FOR CYLINDER LOCKS

5 (71) We, CRASNIAŃSKI FRANCE S.A., a société anonyme organised and existing under the laws of France, of 8 rue du Général ferrié, 38 Grenoble, France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to a flat key for cylinder locks which is made in at least two parts, namely a shank profiled and milled along its edges in accordance with the contours of the cylinder of the lock, and a separate operating head rigidly united with the shank.

15 It has already been proposed (*cf.* French Patent 73 14 753) to obtain such a rigid assembly by fitting the head of the shank in a slot formed in the operating head made separately either of metal or of a plastics material either in the form of a single moulding or in the form of two parts assembled by crimping, bonding or riveting. 20 In one of the embodiments described in the aforementioned French Patent, the shank terminates in a head which is equal in width to or slightly wider than the shank and which is in the form of a very shallow wedge 25 which is fitted into a slot of corresponding shape in the operating head, the assembly being held together by frictional forces occurring between the surfaces of the wedge-shaped head of the shank and the surfaces of the slot in the manner of a so-called "Morse" cone mounting of the kind used for positioning a spindle in the headstock of a lathe.

30 The present invention relates to a key with a separate head which provides for much simpler assembly and which calls for far less precision in formation both of the head of the shank and of the slot in the separate operating head.

35 The key according to the invention comprises a shank with an elongated head having a width equal to or slightly greater than that of the shank engaged in a slot

50 formed in a separate operating head, where in the operating head is made of a moulded plastics material which is sufficiently flexible to enable the shank to be forced into the slot with consequent deformation of the operating head, the said operating head and the shank being rigidly held together by the elastic or frictional forces caused by the deformation of the head.

55 This effect of the deformation of the operating head can be reinforced by inserting into openings formed in the head locking members of various shapes engaging in notches formed along the edge(s) of the shank to give a positive locking effect between the two assembled parts of the key.

60 Several embodiments of the key according to the invention are described by way of example in the following with reference to the accompanying drawings, wherein:

65 Figure 1 is a plan view of a key during assembly.

70 Figure 2 is a sectional elevation of another embodiment of the key in which the head of the shank and the slot have interlocking serrations.

75 Figures 3 and 4 show other embodiments in which the two parts of the key have other interlocking means.

80 Figures 5 and 6 are respectively a plan view of and a cross-section through an embodiment in which the assembly is locked by insertion of an auxiliary element, Figures 7, 8 and 9, 10 being corresponding views of another two similar embodiments.

85 Figures 11 and 12 are respectively an elevation of and a cross-section through a key comprising a two-part operating head.

90 Figures 13 and 14 show a key in which the two parts of the key are locked in position by heat-induced deformation of the operating head.

95 The key illustrated in Figure 1 consists of a shank 1, which is shown merely as a blank, and which comprises a wedge-shaped head 2, as in French Patent No. 73 14 753, formed near its rounded end with a hole 3 for mounting the key on a key ring, key

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holder or the like. The separate operating head 4 is made of a relatively flexible plastics material formed during moulding with a slot 5 which is also wedge-shaped. When the shank is inserted into the slot 5 in the head 4, little resistance is encountered until just before the position illustrated in Figure 1, after which forced insertion expands the slot until the end of the head 2 projects sufficiently from the upper edge of the head 4 for the notch 6 to coincide with the hole 3. The deformation which the head 4 undergoes by insertion of the head 2 provides firm holding of the operating head 4 on the shank 1 of the key.

In the embodiment illustrated in Figure 2, the head 2 of the shank 1 has parallel edges formed with teeth or serrations 7 which, when the shank is inserted by force into the head 8, anchor the shank in the deformable plastics material. In the embodiment illustrated in Figure 3, a similar anchoring effect is obtained by means of projections 9, 9' formed on the sides of the slot 10 in the head 11 which, when the shank 12 is inserted, engage in teeth 13, 13' formed along its edges. It is of course possible, in order to facilitate moulding, to adopt the opposite arrangement, i.e. to provide projections along the edges of the shank and teeth on the inside of the slot. Thus, a very firm assembly is obtained by the interlocking effect in conjunction with the deformation of the operating head as a whole caused by forced insertion of the shank 12.

In the embodiment illustrated in Figure 4, elastic tongues 14, 14' are moulded on the lateral edges of the slot 15 in the operating head 16. In their rest position, these tongues spread out towards their ends from the corresponding edge of the slot to which they are attached. The shank 17 has along its edges notches 18, 18' having sloping bases. When the shank 17 is inserted into the slot 15, the tongues 14, 14' move aside and are applied against the edges of the slot. When the shank has reached its final position, they then snap elastically into the notches 18, 18', further improving the holding effect, attributable to deformation of the head whose slot is expanded by the shank of the key.

As already mentioned, the rigidity of the assembly can be improved by inserting an auxiliary locking element. Thus, as illustrated in Figures 5 and 6, the head 19, formed with a slot 20 in which the shank 21 of the key is engaged, comprises two openings 22, 22', for example rectangular in shape, formed in the lateral surfaces of the head on either side of the slot which they partially intersect. The arms 23, 23' of a staple 24 are inserted by force into these openings 22, 22', simultaneously engaging in notches 25, 25' formed in the edges of the shank 21. Between the openings 22, 22', one of the lateral surfaces of the head 19 has a recess 26 in which the base of the staple 5 is accommodated so that its outer face is flush with the face of the head 19, which provides the key with an aesthetic appearance. For decorative purposes, the staple 24 can also be moulded from a plastics material differing in colour from the head.

In the embodiment illustrated in Figures 7 and 8, the head 27, in addition to the slot 28 into which the shank 29 is inserted, has a transverse slot 30 opening into the slot 28. A plate 31 of any suitable material, either metal or plastic, is forced into this transverse slot, engaging in a rectangular notch 32 provided in the corresponding edge of the shank 29 to form a key. In addition to locking the shank in position, the additional deformation which the head 27 undergoes when the plate 31 is inserted into it strengthens the hold of the operating head on the shank.

The embodiment illustrated in Figures 9 and 10, which is based on a similar principle to that of Figs. 7 and 8 has a head 33 formed with a bore 34 extending through the slot 35. The shank 36 of the key, inserted into the slot 35, also has a hole 37 which coincides with the bore 34 when the shank is inserted. A stud 38 attached to the head 33 by an elastic web 39 and preferably moulded with the head, is introduced by force into the openings 34 and 37 in order to complete holding and locking of the head on the shank.

Figures 11 and 12 show a key comprising an operating head made of a flexible plastics material in two parts 40, 40' both having slots 41, 41' formed with an inner shoulder 42, 43-42', 43' on each edge which fit onto rectangular projections 44, 44' of the shank 45. The adjacent edges of the two parts of the head comprise respectively a bead 46, 46' and a complementary groove 47, 47' in which the bead is held by elastic deformation on the lines of profiled strip fastenings.

In the embodiment illustrated in Figures 13 and 14, the head 48 is made of a thermoplastic material and, after insertion of the shank 49, indents 50, 51-50', 51' are made by thermoforming with a suitable punch on the two faces of the head so as to displace the plastics material into the notches 52, 52' formed in the edges of the shank 49.

Finally, the present invention lends itself to the embodiment described in Addition No. 73 22467 to French Patent No. 73 14 753, in which the head of the shank is fixed in an intermediate element which is forced into the slot in the operating head. If desired the intermediate element can have a groove corresponding in width to the head of the shank and at least one edge of the said

head has a notch which engages with a projection on one edge of the said groove, or vice versa.

WHAT WE CLAIM IS:—

5. 1. A flat key comprising a shank with an elongated head having a width equal to or slightly greater than that of the shank engaged in a slot formed in a separate operating head, wherein the operating head is made of a moulded plastics material which is sufficiently flexible to enable the shank to be forced into the slot with consequent deformation of the operating head, the said operating head and the shank being rigidly held together by the elastic or frictional forces caused by the deformation of the head.

10. 2. A flat key as claimed in claim 1 wherein the end of the elongated head of the shank is rounded to facilitate its insertion into the slot in the operating head.

15. 3. A flat key as claimed in claim 1 or claim 2 wherein the head of the shank and the slot in the operating head are in the form of shallow-sided wedges.

20. 4. A flat key as claimed in any of claims 1 to 3 wherein the edges of the head of the shank are formed with serrations or teeth.

25. 5. A flat key as claimed in claim 1, wherein inside the slot in the operating head, projections or recesses are formed which provide for an interlocking effect with corresponding recesses or projections formed on the cooperating surfaces of the head of the shank.

30. 6. A flat key as claimed in claim 1, wherein inside the slot, tongues are formed whose ends are detached from the wall of the slot so as to form elastic detents which, when the shank of the key is inserted, engage in recesses provided along the head of the shank.

35. 7. A flat key as claimed in claim 1, wherein in the assembled operating head and shank are further secured together by means of a locking element whose insertion also deforms the said operating head.

40. 8. A flat key as claimed in claim 7 wherein the locking element is in the form of a staple whose two arms engage in openings formed in the lateral faces of the operating head on either side of the slot and opening into it.

45. 9. A flat key as claimed in claim 8, wherein the lateral edges of the head of the shank have notches in which the arms of the staple engage.

50. 10. A flat key as claimed in claim 7, wherein the locking element is in the form of a plate inserted by force into a transverse slot opening on to one edge of the operating head and into the main slot to engage in a notch formed in the edge of the head of the shank.

55. 11. A key as claimed in claim 7, wherein the locking element is in the form of a stud which is attached to the operating head by a flexible web and which is introduced into a transverse hole in the operating head coinciding with a hole formed in the head of the shank.

60. 12. A key as claimed in claim 1, wherein the operating head is made of a thermoplastics material, and wherein the operating head and the shank are further secured together by a locking effect caused by two indents made after insertion of the shank, by thermoforming on the two faces of the head so as to displace the thermoplastics material into notches formed in the edges of the head of the shank.

65. 13. A key as claimed in claim 1, wherein the separate operating head is in two parts whose edges are formed respectively with beads and grooves which interlock with one another and wherein the inside of the slot and the head of the shank are formed with complementary locking projections and recesses.

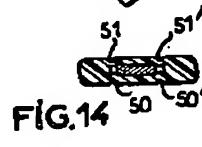
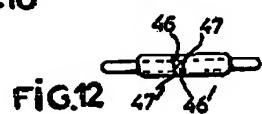
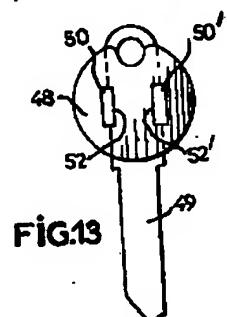
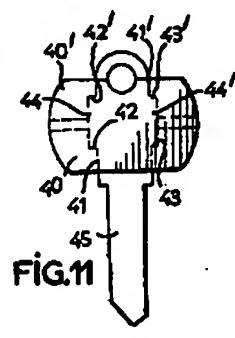
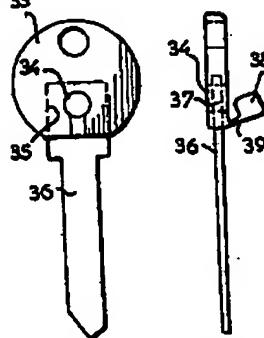
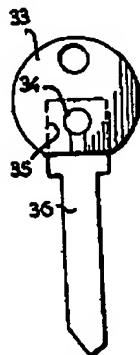
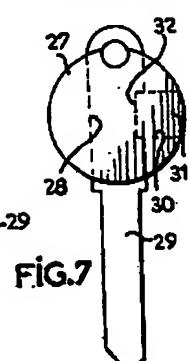
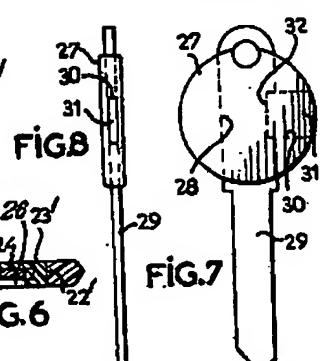
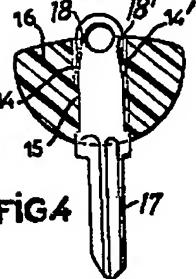
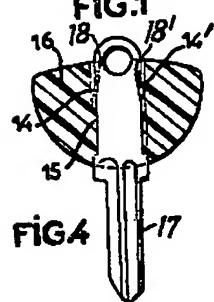
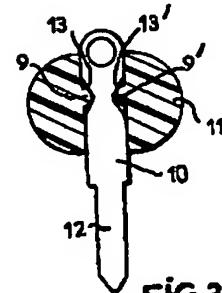
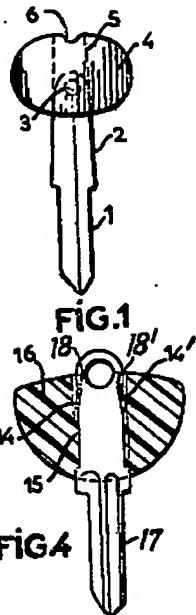
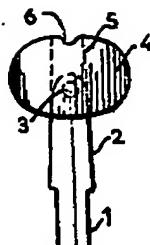
70. 14. A key as claimed in claim 1, wherein the head of the shank is fixed in an intermediate element which is forced into the slot in the operating head.

75. 15. A key as claimed in claim 14, wherein the intermediate element has a groove corresponding in width to the head of the shank and wherein at least one edge of the said head has a notch in which engages a projection provided on one edge of the groove of the intermediate element, or vice versa.

80. 16. A key as claimed in claims 14 or 15 wherein the intermediate element is made of a plastics material which undergoes deformation when the head of the shank is inserted, and which itself is inserted by force into the slot in the operating head.

85. 17. A flat key substantially as hereinbefore described with reference to Figures 1, 2, 3, 4, 5 and 6, 7 and 8, 9 and 10, 11 and 12, or 13 and 14 of the accompanying drawings.

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